PATENT CLAIMS

1. A fiber optic current sensor having a coiled sensor fiber (1) which encloses a current conductor (S), and at least one phase delay element (4, 5) adjoining the sensor fiber (1), characterized in that the at least one phase delay element (4, 5) has a phase delay with a temperature dependence which at least approximately compensates for a temperature dependence of a Verdet's constant (V) of the sensor fiber (1).

2. The current sensor as claimed in claim 1, characterized in that the at least one phase delay element (4, 5) has a phase delay angle whose value deviates from a phase delay angle of an ideal phase delay element.

3. The current sensor as claimed in one of claims 1 or 2, characterized in that the at least one phase delay element (4, 5) is a $\lambda/4$ fiber segment with an elliptical core, and in that the $\lambda/4$ fiber segment has a length (L) which deviates from a quarter or an odd multiple of a quarter of a beat length of orthogonal polarization modes.

4. The current sensor as claimed in claim 2, characterized in that the magnitude of the phase delay angle is selected as a function of a mutual alignment of fast axes of the phase delay element (4, 5).

5. The current sensor as claimed in claim 2, characterized in that the magnitude of the phase delay angle is selected as a function of a sign of the temperature dependence of the at least one phase delay element (4, 5).

6. The current sensor as claimed in claims 2, 4 and 5, characterized in that there are at least two phase delay elements (4, 5), each having a fast axis, the fast axes being orientated at least approximately parallel to one another, and in that in the case of a temperature dependence of the phase delay elements (4, 5) of positive sign the phase delay angle is greater, and in the case of a temperature dependence of negative

sign it is smaller than a phase delay angle of an ideal phase delay element.

7. The current sensor as claimed in claims 2, 4 and 5, characterized in that there are at least two phase delay elements (4, 5) each having a fast axis, the fast axes being orientated at least approximately orthogonally to one another, and in that in the case of a temperature dependence of the phase delay elements (4, 5) of positive sign the phase delay angle is smaller, and in the case of a temperature dependence of negative sign it is larger than a phase delay angle of an ideal phase delay element.

8. The current sensor as claimed in claim 1, characterized in that it has a Sagnac interferometer.

9. The current sensor as claimed in claim 1, characterized in that it has a reflection interferometer.